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**ABSTRACT**

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The present invention provides a closed loop control strategy using system wavelength profile information to provide accurate derivation of Raman gain in a fiber optic span. The present invention overcomes prior art limitations in which a desired Raman gain is estimated on the basis of a modeled solution, without taking into account the dynamic nature of the system span profiles. The method and system according to the present invention provide an improved method of calculating Raman gain which permits dynamic adjustments to system parameters, thus correcting gain inaccuracies induced by the application of known models and permitting an accurate derivation of the Raman gain. Cost-effective optical spectrum analyzers are used to monitor wavelength profiles, which permits the mapping of transmit and receive profiles within a span. This mapping information is then collected in a central location, such that the Raman gain within the span may be derived.